

WHAT IS CLAIMED IS:

*SUB A'* 1. A data network comprising:  
2 a sending node;  
3 a receiving node coupled to receive a plurality of data information packets  
4 from the sending node; and  
5 at least a first and second transmission channel coupled to the sending and  
6 receiving nodes, wherein each data information packet transmitted  
7 across the network is selected for transmission on one of the first and  
8 second transmission channels according to predetermined criteria.

1 2. The data network of claim 1 wherein the first and second transmission  
3 channels are, respectively, a low latency channel for transmitting data packets  
4 meeting a low latency criteria, and a high bandwidth channel for transmitting data  
5 packets meeting a high bandwidth criteria.

1 3. The data network of claim 2 wherein information relating to  
2 scheduling of the high bandwidth channel is transmitted over the low latency channel.

1 4. The data network recited in claim 1 wherein one of the first and second  
2 transmission channels is coupled to transmit control information relating to network  
3 protocol according to the predetermined criteria.

*SUB A'* 5. The data network recited in claim 1 wherein the predetermined criteria  
2 includes at least one selected from the set of a size of a data information packet, a type  
3 of operation associated with the data information packet, a latency budget for the data  
4 information packet, security needs of the data information packet and reliability needs  
5 of the data information packet.

1 6. The data network recited in claim 5, wherein a software program  
2 allocates the data information packet to one of the transmission channels according to  
3 at least one of the predetermined criteria.

1           7. The data network recited in claim 6, wherein the software program is  
2 one of a user program and a system program.

1           8. The data network recited in claim 5, wherein the type of operation  
2 includes a synchronization operation.

1           9. The data network recited in claim 8, wherein the synchronization  
2 operation includes at least one of a lock operation, an atomic read-modify-write  
3 operation, and a fetch-and-increment operation.

1           10. The data network recited in claim 1 wherein the data network is a  
2 switched data network having at least one switch for each channel.

1           11. The data network recited in claim 1 wherein at least one of the sending  
2 node and the receiving node includes a plurality of buffer descriptors identifying  
3 memory segments containing data.

1           12. The data network recited in claim 1 wherein the sending node and the  
2 receiving node are nodes within a cluster network.

1           13. The data network as recited in claim 2 wherein a node includes  
2 separate send and receive buffers for the first and second transmission channels.

1           14. The data network as recited in claim 2 further comprising:  
2           a scheduler circuit for the high bandwidth channel coupled to the high  
3           bandwidth channel and low latency channel; and wherein the scheduler  
4           circuit is coupled to receive a request sent into the low latency channel,  
5           the request requesting permission to transmit a packet over the high  
6           bandwidth channel, the scheduler logic responsive to the request to  
7           provide a grant indication over the low latency channel indicating the  
8           request was granted.

1        15. The data network as recited in claim 14 wherein the grant indication is  
2 provided at a fixed time relative to a predetermined time period, and the grant  
3 indication synchronizes nodes of the network to the predetermined time period.

1        16. The data network as recited in claim 14 wherein the grant indication  
2 includes a unique identifier corresponding to a number of an output port through  
3 which the grant indication was sent and wherein during node initialization, a node  
4 coupled to the output port listens to grant packets and uses the unique identifier as its  
5 node identifier in subsequent transactions over the data network.

1        17. The data network as recited in claim 14 wherein the grant indication is  
2 transferred with a higher priority across the low latency channel than other low  
3 latency traffic.

1        18. The data network as recited in claim 14 wherein the request indication,  
2 the grant indication and an acknowledge indication are always sent at different times  
3 over the low latency channel, thereby avoiding collisions between the request  
4 indication, the grant indication and the acknowledge indication, the acknowledge  
5 indication being sent by a receiving node over the low latency channel to indicate  
6 successful receipt of information sent over the high bandwidth channel.

1        19. The data network as recited in claim 2 wherein a receiving node sends  
2 an acknowledge indication over the low latency channel, the acknowledge indication  
3 indicating successful receipt of information sent over the high bandwidth channel.

1        20. The data network as recited in claim 19 wherein the acknowledge  
2 indication is transferred with a higher priority across the low latency channel than  
3 other low latency traffic.

1        21. The data network as recited in claim 1 wherein at least one of the first  
2 and second transmission channels have characteristics facilitating transfer based on  
3 the predetermined criteria, the predetermined criteria including at least one of low  
4 latency, high bandwidth, security and reliability.

1        22. A method for transmitting data traffic between at least a first and  
2        second node in a network having at least a first and second transmission channel, the  
3        method comprising:

4                organizing the data traffic prior to transmission across the network into at least  
5                a first and second group according to predetermined criteria; and  
6                transmitting the first group of the data traffic over the first transmission  
7                channel and the second group of the data traffic over the second  
8                transmission channel.

1        23. The method recited in claim 22 wherein the first and second  
2        transmission channels are independent.

1        24. The method recited in claim 22 further comprising:  
2                transmitting control information relating to network protocol over one of the  
3                first and second transmission channels along with one of the first and  
4                second groups of data traffic.

1        25. The method recited in claim 24 wherein the first and second  
2        transmission channels are respectively a high bandwidth channel and a low latency  
3        channel, and wherein the first group of data traffic is transmitted over the low latency  
4        channel, the low latency channel for transmitting data packets meeting a low latency  
5        criteria; and wherein the second group of data traffic is transmitted over the a high  
6        bandwidth channel, the high bandwidth channel for transmitting data packets meeting  
7        a high bandwidth criteria.

1        26. The method recited in claim 25 further comprising:  
2                scheduling transmittal of data traffic across the high bandwidth channel using  
3                control information transmitted over the low latency channel.

*Sub A*    27. The method recited in claim 26 further comprising:  
2                transferring the control information across the low latency channel with a  
3                higher priority than the first group of data traffic transferred across the

4 low latency channel, the control information being related to  
5 scheduling of the high bandwidth channel.

1 28. The method as recited in claim 27 wherein the higher priority prevents  
2 the control information from being dropped.

1 29. The method recited in claim 25 further comprising:  
2 transmitting smaller sized data packets across the low latency channel with  
3 limited scheduling; and  
4 transmitting highly scheduled large sized data packets across the high  
5 bandwidth channel.

1 30. The method recited in claim 22 wherein the predetermined criteria  
2 includes one or more of a size of a packet being organized into one of the first and  
3 second groups, a type of operation associated with the data packet, a latency budget  
4 for the data packet, a security level of the data packet, and criticality of the  
5 information contained in the data packet.

1 31. The method recited in claim 30 further comprising:  
2 allocating data packets to one of the transmission channels according to the  
3 predetermined criteria.

1 32. The method recited in claim 22 wherein at least one of the transmission  
2 channels is associated with a plurality of lists of buffer descriptors, the lists of buffer  
3 descriptors related to a plurality of memory segments.

1 33. An apparatus for transmitting data traffic and control information  
2 between at least a first and second node of a network, the control information related  
3 to protocol of the network, the apparatus comprising:  
4 means for organizing the data traffic into at least a first and second group  
5 according to predetermined criteria; and  
6 means for transmitting the data traffic using an independent transmission  
7 channel for the first and second group.

1       34. The apparatus recited in claim 33 further comprising:  
2       means for transmitting the control information across one of the transmission  
3       channels.

1       35. The apparatus recited in claim 33 further comprising:  
2       means for transmitting the first group of the data traffic having low latency  
3       characteristics; and  
4       means for transmitting the second group of the data traffic having high  
5       bandwidth characteristics.

*Sub A' >*  
1       36. A computer program product encoded in at least one computer  
2       readable medium, the computer program product comprising:  
3       code executable to select one of at least two independent transmission  
4       channels of a network for transmission of data according to criteria  
5       associated with the data; and  
6       code executable to write the data into one of the two independent transmission  
7       channels.

1       37. The computer program product as recited in claim 36 wherein the code  
2       writes the data into one of the two independent transmission channels by writing into  
3       a buffer associated therewith.

1       38. The computer program product as recited in claim 36 wherein the  
2       criteria includes at least one of, a size of the data, a type of operation associated with  
3       the data, a latency budget for the data, a security level of the data packet, and  
4       criticality of the information contained in the data.

*Sub A' >*  
1       39. The computer program product as recited in claim 36,  
2       wherein the at least one computer readable medium is selected from the set of  
3       a disk, tape or other magnetic, optical, or electronic storage medium  
4       and a network, wireline, wireless or other communications medium.